
New Combinations in North American *Asarum* (Aristolochiaceae)

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ABSTRACT. New nomenclatural combinations are needed for some of the North American species of *Asarum* to bring their names in line with the current understanding of relationships in the genus and to provide correct names for a treatment in the *Flora of North America*.

Asarum L., in the broad sense, is a genus of low herbs with creeping stems and a few cordate-reniform leaves. Its flowers have a radially symmetrical, three-lobed calyx, twelve or fifteen stamens, and six styles. Its fruits are fleshy capsules containing many flattened, cordate, arillate seeds. There are about 90 species in *Asarum* s.l. (Araki, 1953; Cheng & Yang, 1983). Most of the species are found in temperate Eastern Asia and the southeastern United States, but a few also occur in Europe, eastern North America, and the Pacific Northwest. It is the only genus in the tribe Asareae and appears to be related to the genus *Saruma* Oliver, a native of China.

Since Braun (1861), a number of sections have been recognized within *Asarum* (Duchartre, 1864; Schmidt, 1935). These are based on the fusion of perianth, the presence of constrictions and annuli in the calyx, the position of stigmas, the length of the anther connectives, the position of the ovary, and the longevity of the leaves. Some of these sections have been raised to generic rank, probably because they appear distinctive within their regional floras. *Hexastylis* Rafinesque of the southeastern United States is one of these. Braun, Duchartre, and Schmidt recognized the same group of species as *Asarum* sect. *Ceratasarum* Braun.

The classification of the species of *Asarum* by Araki (1953) clarified the similarities and differences between the sections. Araki recognized two subgenera in *Asarum*: subg. *Asarum*, distinguished by the sepals being free above the base and forming a pseudotube, and subg. *Heterotropa* (Morren & Decaisne) O. C. Schmidt, distinguished by the sepals being fused into a tube. He placed section *Ceratasarum* (*Hexastylis*) in subgenus *Heterotropa* with sections *Heterotropa* (Morren & Decaisne) Braun and *Asiasarum* (Maekawa) Araki, and he placed the other North American species in subgenus *Asarum*.

The recognition of *Hexastylis* as a genus has

persisted in the southeastern United States, in part, because Blomquist overlooked Araki's classification when writing his influential revision of *Hexastylis* (Blomquist, 1957). Also, it is easy to distinguish the species of *Asarum* sect. *Ceratasarum* (*Hexastylis*) from *Asarum canadense* L., the only other species of *Asarum* in the eastern United States.

Blomquist (1957) listed 11 characters that distinguish the groups in eastern North America. Extrorse stamens and bifurcate style extensions define the species in section *Ceratasarum*. The other characters cited by Blomquist are less reliable. The thick, variegated, glabrous leaves that help to distinguish *Hexastylis* in the southeast are similar to those found in many other species of *Asarum* subg. *Heterotropa*, and in *Asarum hartwegii* S. Watson, a species in subgenus *Asarum* native to northwestern North America. *Asarum europaeum* L., the type of *Asarum* and subgenus *Asarum*, has leaves that are evergreen, but not variegated. The tubular calyces are characteristic of all species in subgenus *Heterotropa*, and subgenus *Asarum* sect. *Brevituba* C.Y. Cheng & C. S. Yang is somewhat intermediate in having species with lobes that are fused at the base. Superior to partly inferior ovaries are also found throughout subgenus *Heterotropa*. Short, blunt extensions on the anther connectives and attenuated calyx lobes are found in many species of *Asarum*, though the tendency is for the extensions of species in subgenus *Heterotropa* to be shorter. Finally, short staminal filaments are also found in all sections of subgenus *Heterotropa* with the exception of section *Asiasarum* (Maekawa) Araki.

Recognition of a broadly defined *Asarum* is in accord with some of the major treatments of the genus. Cheng & Yang (1983) used the broad concept of *Asarum* in their treatments of the Chinese species. Owhi (1965) and Hatusima & Yamahata (1988) used it in their treatments of the Japanese species. In addition, the recognition of a broadly defined *Asarum* is consistent with the generic concepts of the other large genera in the Aristolochiaceae (i.e., *Aristolochia* (Schmidt, 1935; Pfeifer, 1966; Ma, 1989), *Thottea* (Ding Hou, 1981)).

With the recognition of *Asarum* in the broad sense, the following new combinations are necessary.

The other species segregated in *Hexastylis* either already have valid names in *Asarum* or are considered synonyms.

***Asarum arifolium* Michaux var. *ruthii* (Ashe) Barringer, comb. nov.** Basionym: *Asarum ruthii* Ashe, Bot. Contr. My Herb. 1: 4. 1897. *Hexastylis ruthii* (Ashe) Small, Fl. S.E. U.S. 1132. 1903. *Hexastylis arifolia* var. *ruthii* (Ashe) H. Blomquist, Brittonia 8: 268. 1957. TYPE: U.S.A. Tennessee: Knox Co., July 1896, *Ruth s.n.* (lectotype, here designated, NY).

Ashe (1897a) originally published *Asarum ruthii* in a pamphlet entitled *Botanical Contributions from My Herbarium. No. 1*, dated 28 Oct. 1897. A later publication drawn from that separate (Ashe, 1897b) cited the earlier publication as the protologue for his names. Blomquist (1957) overlooked the earlier pamphlet, citing the later as the source of the names, but the earlier pamphlet is effectively published according to the *Code* (Greuter et al., 1988) and must be used despite its obscurity.

Ashe (1897a) did not designate a type in the protologue, but listed his herbarium numbers 1983, 2011, and 2015. In the later paper (Ashe, 1897b) he noted the type locality as Morristown, Tennessee. No Ashe specimens were found that correspond with either the numbers cited or the locality. No Ruth specimens are known from this locality, because the original Ruth material burned in 1934 (Anonymous, 1934). As a lectotype, the Ruth collection from Knox County, Tennessee, in 1896 corresponds to the protologue and is the extant collection most likely to have been seen by Ashe prior to publication.

Plants of variety *ruthii* have generally occurred west of the Appalachian Mountains in Tennessee and Kentucky. They have calyx lobes that are shorter and more erect than the typical variety found east of the range.

***Asarum arifolium* Michaux var. *callifolium* (Small) Barringer, comb. nov.** Basionym: *Asarum callifolium* Small, Bull. Torrey Bot. Club 24: 334. 1897. *Hexastylis arifolia* var. *califolia* (Small) H. Blomquist, Brittonia 8: 268. 1957. TYPE: U.S.A. Florida: shady woods, *Chapman s.n.* (holotype, NY).

Blomquist (1957) and Gaddy (1987b) showed that *Asarum callifolium* Small is a large-flowered, Gulf Coast variety of the widespread *A. arifolium* Michaux.

***Asarum contractum* (H. Blomquist) Barringer, comb. nov.** Basionym: *Hexastylis contracta* H.

Blomquist, Brittonia 8: 279. 1957. TYPE: U.S.A. North Carolina: Buncombe Co., Broad River, between Old Fort and Bat Cave, 4 June 1951, *Godfrey & Anderson 51225* (holotype, DUKE; isotype, NCS).

Hexastylis rhombiformis Gaddy, Brittonia 38: 82. 1986. TYPE: U.S.A. North Carolina: Transylvania Co., North Fork of the French Broad River, ca. 6 mi. NNW of Rosman, 22 Apr. 1982, *Gaddy 250* (holotype, CLEMS).

Flowers of *Asarum contractum* are variable in size and shape. Gaddy (1986, 1987b) segregated plants with prominent reticulation inside the calyx and the broadest part of the calyx above the middle into *Hexastylis rhombiformis* Gaddy. However, the photograph accompanying the original description clearly shows flowers of *H. rhombiformis* with the shape of typical *A. contractum*. Blomquist was aware of this variability in *A. contractum* and included both extremes in his figures 7 and 8 (Blomquist, 1957). Gaddy (1987b) pointed out the unusual distribution of *A. contractum*, but *H. rhombiformis* is sympatric with *A. contractum* in acidic woods on the Blue Ridge of western North Carolina. Further study may show this group to be another phase of the variable *A. virginicum* L.

***Asarum speciosum* (Harper) Barringer, comb. nov.** Basionym: *Hexastylis speciosa* Harper, Torrey 24: 77–83. 1924. TYPE: U.S.A. Alabama: Autauga Co., about 2 mi. E of Booth, 18 May 1924, *Harper & Holt s.n.* (lectotype, designated by Blomquist (1957), NY).

Blomquist (1957) compared this species to the Asian species of *Asarum* subg. *Heterotropa* that have a broad mouth and spreading calyx lobes. None of the Asian species is quite like this species, though. In the Asian species, the flare is made up in part of an annulus that constricts the opening of the calyx tube. Such an annulus is absent in *A. speciosa*. Also, the bifid style extensions and stamen connectives without extensions clearly ally *A. speciosa* with section *Ceratasarum*.

***Asarum shuttleworthii* Britten & Baker var. *harperi* (Gaddy) Barringer, comb. nov.** Basionym: *Hexastylis shuttleworthii* (Britten & Baker) Small var. *harperi* Gaddy, Sida 12: 54. 1987. TYPE: U.S.A. Georgia: Madison Co., just N of GA 106, 14.2 mi. NE of Athens, 9 May 1986, *Gaddy s.n.* (holotype, CLEMS; isotypes, GH, MO, NCU, NY).

This variety is known in the horticultural trade under the cultivar name 'Calloway' (Galle, 1984).

It is a bog-growing variety with elongate, rather than short, rhizomes (Gaddy, 1987a).

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